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MANAGING PROLIFERATION IN SOUTH ASIA: A CASE FOR ASSISTANCE TO UNSAFE NUCLEAR ARSENALS

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Introduction

Three years ago, the series of nuclear explosions in South Asia removed any hope that nuclear weapons would remain "in the closet." Since then both countries have gradually developed their nuclear systems and plans[1] and little real progress has been made to reduce the dangers. Instead, the United States continues its principled stand to stop and reverse nuclear proliferation in South Asia or at least under a new Administration appears to be ignoring the problems attendant with new nuclear arsenals.[2] In much the same way the Bush Administration seeks to "square the circle" in the anti-ballistic missile arena, so too must we find a new proliferation policy that makes the most of a bad situation. In order to reduce the chances for an inadvertent nuclear exchange in South Asia, American policymakers should adopt a novel solution to help "manage" proliferation: we should transfer selected nuclear weapon command and control (C2) systems to India and Pakistan. The objective is to transform inherently destabilizing nuclear arsenals into forces less likely to be fired in anger or in error.

This paper reviews why these countries developed nuclear weapons and why it will be so hard to force them to abandon them. It asks whether nuclear weapons inherently improve stability, paying special attention to unique challenges in South Asia. It addresses whether nuclear C2 can mitigate problems associated with nuclear weapons. It examines where the shortfalls are in India and Pakistan's nuclear C2 arrangements, recommending where we should lend assistance. Despite constraints on such support, the longer-term needs to prevent a nuclear exchange via "managed" proliferation outweigh the barriers protecting a principled "zero-proliferation" stand. We must, in the words of one recent

commentary, "delink issues of nuclear safety from nuclear proliferation…[and] redefine the nonproliferation regime in a more realistic manner."[3]

Rationale for Developing Nuclear Arsenals

As much as there has been controversy and speculation regarding the test results in 1998,[4] so too have there been disputes whether the nuclear weapons are deployed or are disassembled. There is disagreement as to what are the precise numbers and types of current/projected warheads and delivery vehicles and what would be the costs for a projected nuclear arsenal.[5] It is not surprising to find that there is also disagreement as to why the two countries developed nuclear weapons. Yet, despite this dispute, in many respects India and Pakistan share many of the same deep-seated insecurity concerns.

While short-term domestic factors in India such as the weak coalition government and a desire to appease the nuclear scientific-technical cabal[6] may have forced New Delhi's hand in performing the 1998 tests, these are insufficient explanations to explain why India developed nuclear weapons. Several long-term factors were at play. India has long held a genuine fear of the Chinese military threat. Beijing's support of Islamabad's nuclear/missile program intensified this concern. Doubts of the extent of its superpower patron's security guarantee and the collapse of the USSR exacerbated India's unease. Finally, the leaders in New Delhi were motivated by a desire for prestige and respect in the international community.[7]

If India's rationale for developing a nuclear arsenal is complex, Pakistan's impetus appears to be simple: a cost-effective reaction to India's overwhelming military capabilities. Still, the same long-term *Realpolitik* factors which drove India to

nuclearization come into play for Pakistan. Pakistan feared its larger neighbor (India) and believed its superpower patron (the United States) was notoriously unreliable.[8] Unlike India however, Pakistan also tied and has continued to press – however heavy-handedly – the linkage between its nuclear program and the seemingly ineluctable Kashmir issue.[9] In short, Pakistan's nuclear weapons program is also ostensibly a bargaining chip to be used to resolve the Kashmir issue, a tactic which is fraught with danger and miscalculation.

The point here is that the roots of both India's and Pakistan's nuclear programs run very deep. In the words of one analyst, "India and Pakistan…are as unlikely to give them up as were Washington and Moscow at the height of the Cold War.[10] Furthermore the same factors which motivated them to develop nuclear weapons are pressuring them to expand and deploy their nuclear weaponry. As a result, it will be difficult, if not impossible, to force either country to disable or destroy its nuclear arsenal. Even if the root causes for developing their nuclear weapons disappear, the weapons themselves will generate powerful bureaucratic and public advocacy for their continued existence.[11] We are thus faced with nuclear weapons in both India and Pakistan for the foreseeable future, leading then President Clinton to call South Asia "the most dangerous place on earth."[12]

Nuclear Weapons, Greater Stability: Extrapolating the Cold War onto South Asia

Of course, many counter that such a provocative claim is more hype than reality. Some argue that now that both countries have come "out of the nuclear closet," there is now improved stability between India and Pakistan. After all had not the nuclear stalemate between the United States and the Soviet Union resulted in greater stability in *their* relations? Does not the "long peace" of the Cold War prove that nuclear weapons

engender sufficient caution in what would otherwise have been a hot and deadly conflict between the superpowers? Therefore, if nuclear deterrence worked for the much more massive arsenals of the United States and Soviet Union, it should also work for the much smaller arsenals of India and Pakistan.

Kenneth Waltz, the leading proponent of such thinking, argues that "the gradual spread of nuclear weapons is more to be welcomed than feared."[13] Many observers of South Asia have taken up Waltz's position, arguing that the nuclear programs force India and Pakistan to adopt a more cautious, less bellicose approach towards each other. In their view, large-scale, deliberate conventional conflict between the two states has lessened considerably. Some analysts even suggest that an inadvertent or accidental war arising over Kashmir is now highly improbable.[14]

However, such an optimistic faith in nuclear deterrence does not bear strong scrutiny. True there was never any nuclear exchange between the United States and the Soviet Union, but several times we came close to the precipice by design (e.g., the 1973 Yom Kippur War) or by inadvertence (e.g., the 1962 Cuban missile crisis). Maintaining nuclear stability is not an easy task; stability takes great conscious effort . There is a strong conceptual argument which posits that the longer a state has nuclear weapons or the greater the number of states with nuclear weapons, the greater the chance of a nuclear exchange. Lewis Dunn best summed up the "nuclear pessimists' " opinion that nuclear deterrence will eventually fail when he wrote, "as more countries acquire the bomb, the number of situations in which a political miscalculation, leadership failure, geographical propinquity, or technical mishap could lead to a nuclear clash will increase."[15] The pessimists' bottomline is that it has been largely a matter of luck which so far has kept

nuclear holocaust at bay to date. More importantly, it will be only a matter of time before an exchange takes place.

Nuclear Weapons, Lessened Stability and More Risky Behavior: Realities of South Asia

Still, a counter-argument may hold that there is no reason that the United States/Soviet Union's luck is not also applicable to India and Pakistan. However, the nature of the United States/Soviet rivalry was far different and less volatile than that in South Asia. Unlike India and Pakistan, the United States and the Soviet Union did not have common and disputed borders. They did not have decades of pre-nuclear antagonism. They neither suffered from military coups nor experienced widespread separatist movements.[16] Most importantly they both had the luxury of time and distance to reduce the pressures for an inadvertent launch or an overly forward-leaning launch on warning posture.[17] In contrast to the somewhat controlled superpower stand-off, the Indo-Pakistani situation is more akin to the Cuban missile crisis. Making things worse is that in this case the crisis atmosphere and risks of miscalculation "would be permanent rather than temporary, would occur without adequate C3I [command, control, communications, intelligence] in place and with political leaderships located less than five minutes from mutual Armageddon."[18] For India and Pakistan, nuclear weapons might have bought them strategic stability, but at the cost of crisis stability. Certainly this is not an encouraging start.

Nuclear weapons may actually encourage risk-taking with regards to peripheral, non-vital issues. During the Cold War, the US and the USSR engaged in numerous proxy

wars, taking care not to directly impinge upon the other's vital interests. In the same vein, India and Pakistan may believe that nuclear arsenals now give them greater leeway to foment internal dissent in the other's territory. No doubt Pakistan's increased support of the Kashmiri separatist movement was encouraged by its sense that its nuclear deterrent would force India into demurring from launching a major conventional counter-attack across the line of control.[19] However due to the historical distrust of each other, what one side mistakenly views as peripheral, the recipient views as vital. The stage is set for potential escalation into nuclear exchange.

Furthermore there is evidence that Pakistan already threatened India with nuclear reprisal during several recent crises. Seymour Hersh argued that in the crises of 1986 and 1990, Pakistan openly flexed its nuclear muscle to convince India to back down by a none too subtle public information campaign (1986) and by deploying nuclear weapons to front line units (1990).[20] Although Hersh's findings are open to question, there is one lesson which Pakistan, if not also India, has learned. By making it *appear* that it had dramatically raised the ante in the crisis, Pakistan ensured American involvement in defusing the crisis.[21] The temptation now exists to play upon these (mis)perceptions to ensure third-party assistance in future conflicts. Eventually however, this bluff may be called. To keep the threat credible, pressures will mount to do more than just make empty rhetorical flourishes and instead actually deploy nuclear weapons during a crisis.

Already strains are showing at Indian and Pakistani self-control at avoiding nuclear saber rattling. Reports surfaced on the possible nuclearization of the 1999 Kargil crisis, most recently in Foreign Policy where an unnamed diplomat stated that India and Pakistan "came very close to a nuclear exchange."[22] Additionally, the Indian Army Chief of Staff

claimed that Pakistan threatened to use nuclear weapons in Kargil if the conflict escalated out of control.[23] Certainly the senior Indian military officials who recently met with a delegation from the United States Air War College opined that Kargil would be the last time they would "let Pakistan get away with provocation."[24] Nuclear weapons do not automatically deter provocations by or counter-attacks against a nuclear foe. At the end of the day, any country will be hard-tempted not to eventually field its nuclear arsenal, however much it may see it as a tool of deterrence vice warfighting. The issue is whether the arsenal can be deployed safely, whether safety brakes can be added to the nuclear juggernauts which India and Pakistan have built.

Nuclear Command and Control (C2): An Improvement to Stability

Several factors make a deployed nuclear arsenal stable and safe from accidental or inadvertent use: preferred political and military behaviors, level of day-to-day operational readiness, and the full scope of nuclear arsenal safeguards.[25] Over the lifetime of a nuclear arsenal, a control system is used more often to ensure that the nuclear weapons are *not* fired accidentally or inadvertently than it is for the authorized launch of the weapons. In this way, C2 plays a vitally important factor in the prevention of an inadvertent or accidental nuclear conflict. Hearkening back to the US/USSR stand-off, the development of strict C2 safeguards bought the superpowers time, both short-term (to prevent accidents and inadvertent launches) and long-term (to establish strategic arms control agreements, confidence building measures, etc to back away from the nuclear precipice), to enhance the element of blind luck.

A secondary if overlooked purpose of nuclear C2, particularly pertinent in the South Asian case, is for mutual reassurance during the endemic crises between India and Pakistan. Knowing that there are no rogues in the other's nuclear C2 chain, believing that the chances for dangerous misunderstandings and misperceptions have been sharply reduced, and accepting that one's own control is unchallenged (from internal or external threats)[26] can play major roles in successful crisis management and de-escalation control.

Finally, C2 also improves the credibility of nuclear deterrence.[27] An effective C2 system deters an adversary and reassures him that one is in control and not liable to strike in error. According to one observer, "the deterree must see how well run the deterror's command system is, thereby gaining confidence in mutual deterrence…both sides [must] fully understand that command and control systems are not the apparatus to launch nuclear war, but the government agency that creates deterrence by communicating through the deterree's command system."[28] Even if some would continue to argue that the Indian and Pakistani nuclear arsenals are as inherently self-stabilizing as the American/Soviet arsenals, none could argue against the need for a system to control those forces. After all, the Cold War competitors employed comprehensive C2 safeguards. Clearly C2 is a vital if under-recognized element in a stable, safe nuclear deterrent.

Obviously there is also a countervailing pressure to ensure the arsenal is responsive to the needs of the country's leadership in case the unthinkable comes to pass. An overly elaborate set of C2 safeguards would make any arsenal useless, negate any intended deterrent effect on the adversary's thinking, and may even tempt an adversary in launching a preemptive strike against such a self-constrained force. As with all things, C2 has its darker flip-side: the war-fighting function of a nuclear arsenal, i.e. the dissemination of

launch orders by authorized personnel to nuclear equipped forces once deterrence breaks down. The nuclear irony is that to deter (and thus hopefully never be fired in anger), the weapons must be perceived to be able to be quickly released in the event deterrence fails.

This balance struck between the desire to keep tight control of a nuclear weapons (stability/safety) yet ensure their use should the need arise (credibility) is what Peter Feaver calls the "negative/assertive" versus "positive/delegative C2" conundrum. Negative control means the prevention of nuclear weapons release while positive control means the permissive release of the weapons. Conversely, assertive control means that authority to launch nuclear weapons is highly centralized and very tightly circumscribed while delegative control implies the decentralization of authority to launch the weapons, presumably once certain criteria are met.[29] Although the conundrum cannot be completely solved, the key to crisis stability is to what degree a nuclear C2 system tends to one or the other extreme. As Feaver writes, "the assertive/delegative distinction…indicates the likely failure modes of the command system...A delegative system…would tend to 'fail deadly' [while] assertive command systems would tend to 'fail safely'."[30] In short, a predominantly "fail-safe" negative/assertive command system,[31] while not a panacea, is at least a good start to help India and Pakistan back away from potential nuclear catastrophe.[32]

Shortfalls in Indian and Pakistani Nuclear Command and Control (C2)

Before examining shortfalls in South Asian C2, it is important to develop a working definition since many who recommend sharing C2 fail to define it. For purposes of this paper, nuclear C2 consists of: 1) weapons safety and security safeguards to ensure

nuclear weapons are not launched by unauthorized personnel; 2) intelligence/early warning networks to determine whether an adversary is executing a nuclear strike; 3) nuclear-critical information flow to keep senior leadership informed of the status of nuclear forces, enable quick, reliable communications to weapon operators, and permit revision/reversal of decisions. Nuclear C2 is supported by: 1) a constitutionally established and stable decision-making process, and, 2) exercises which reassure oneself and one's adversary that the weapons will not be launched inadvertently. To a limited degree, some of these elements exist in South Asia. However, a great deal more is needed to give India and Pakistan "time" and "distance" to establish strategic arms control agreements and confidence building measures.

Various South Asian officials have stressed their understanding of the requirement for a secure and reliable C2 system for their arsenals. India has been particularly active in establishing its command and control requirements in its draft nuclear doctrine.[33] Several members of the Indian academic and defense intellectual communities have outlined in great detail what it takes to control nuclear forces, to include a mixture of hardened and mobile command posts.[34] However, one suspects that New Delhi is nowhere near meeting these expectations anytime soon. In comparison, Pakistan has generally been less forthcoming than India with regard to its nuclear C2 requirements. Until very recently, Pakistan relied upon simple declarations that a national nuclear command authority has been established in the persons of the Prime Minister (now the Chief Executive under martial law), several ministers and the Chairman of the Joint Chiefs of Staff Committee. Further details have since surfaced regarding the composition and functioning of several committees and a planning division within the Joint Strategic Headquarters to oversee

nuclear weapons development, deployment and employment.[35] What Islamabad foresees as its genuine C2 requirements is a matter of conjecture. Clearly even if it wished to emulate the extensive control system publicly envisioned by some in New Delhi, it is likely that it could not afford the expense. The limited evidence suggests that both countries have a very limited nuclear C2 structure in place and this will remain limited for the foreseeable future. After all, there is a historical preference for bureaucracies to prefer warheads and delivery vehicles over the less glamorous C2.[36]

Turning first to the weapons safety and security safeguards, speculation holds that at present there are no electronic locks on Indian or Pakistani warheads. Security against an unauthorized or inadvertent launch appears to be assured only by keeping the warheads and their delivery systems separate.[37] This is at best a stop-gap measure which would be undone the minute either country operationally deploys its nuclear weapons. There appears to be some future promise of India developing and implementing protective measures such as the two-man rule (requiring two vetted individuals to inspect/repair/move/launch/detonate a nuclear device), permissive action links (PALs) (preventing a nuclear detonation unless proper electronic codes have been entered), and environmental sensing devices (ESDs) (permitting a detonation only when certain delivery parameters [e.g. speed or altitude] have been reached). When this will be done is unknown.

Most worrisome is the nature of Pakistan's nuclear weapons safety design. If Pakistan's weapons design is based upon a Chinese system as alleged, it is very likely that Pakistan's arsenal like China's lacks sufficient technological barriers to inadvertent, accidental or unauthorized use. Even if Pakistan were to adopt the Chinese organizational

alternative to technological safety features (i.e. establishing an nuclear warhead-control organization independent of its strategic delivery forces[38] and keeping warheads removed from their delivery vehicles), there are two problems. First, how to ensure that organization's loyalty to authorized decision-makers when the identity of the decision makers are often up for grabs given Pakistan's history of military coups. Second, given the likelihood that Pakistan will eventually deploy armed weapons, the protection afforded by separated components will evaporate. Fortunately, the Pakistanis have recently expressed interest in indigenous and foreign developed fusing, safety and arming systems.[39]

The next troublesome issue is the quality of their intelligence and early warning networks. The challenge for these systems is to determine not only what the adversary is doing, but also what he is *not* doing.[40] Intelligence and early warning networks can do a lot for confidence building and crisis de-escalation. If a country's warning systems reliably indicate there are no impending preparations for a nuclear strike by the adversary, the chance of worst-case miscalculation drops. However, in a climate of increased tensions and historic mistrust, the absence of reliable threat information can easily lead to a worse-case assessment of the other's intentions. Poor intelligence is often worse than none at all. This is often the situation in South Asia. Neither country has a strong, objective and accurate intelligence service due to inadequate and inappropriate collection capability,[41] organizational disconnects, and politicized analysis.[42]

South Asian decision-makers often ignore analyses which do not fit with their preferred policies and preconceptions. Their track record, particularly India's, in correctly interpreting and acting on intelligence reports has been dismal. There have been a series of intelligence fiascoes with China's attack on India in 1962, India's failure to predict

Pakistan's reactions to the 1986 Brasstacks exercise, and widespread problems during the 1999 Kargil crisis.[43] As Kanti Bajpai observed, "the organizational competence of both Indian and Pakistani intelligence leaves something to be desired…[The addition of nuclear weapons in the mix now] raises totally new problems of intelligence gathering and assessment for both sides."[44]

Even worse, neither country has the ability to detect or track missile launches (the most likely means of weapons delivery).[45] The first indication that a nuclear attack was underway would be the explosions taking place overhead. Unless/until New Delhi and Islamabad obtain adequate strategic warning capabilities/support, they will likely be tempted to launch preemptively or at least launch upon questionable warning.[46]

An item shrouded in deep mystery is both countries' system of nuclear-critical information flow to feed intelligence and operational reports to the senior leadership and to pass their decisions down to the nuclear weapons operators. Obviously concern over exposing a weak link or critical node in the process sharply limits any public discussion by either country.[47] Commentators speculate that "there is no indication that Pakistan and India have reliable, sophisticated command and control systems for managing the process from building to actually using nuclear weapons."[48] Based upon the assumption that new nuclear states like India and Pakistan face greater fiscal, technological, and institutional barriers to creating a robust C2 system, experts such as Scott Sagan conclude that their arsenals will inherently be "considerably less safe than those of current nuclear powers…Some emergent nuclear powers…may not be able to afford even a modicum of mechanical safety devices and modern warning sensors and will therefore be more prone to accidents and false warnings."[49]

At least for many Indian commentators the preference is for such a small, limited C2 system, based less on objective fixed requirements attendant to nuclear deterrence/warfighting and more on cost concerns. It is of deep concern that much of the Indian counter-debate in support of a far simpler C2 system focuses on the cost aspect vice what would actually be required.[50] Arguments such as that of Prime Minister Vajpayee that "since India's nuclear doctrine is different from that of the (other) nuclear powers, India does not need to replicate their command and control structures"[51] are common. However, this flies in the face of the extreme demands placed on India's proclaimed "no first use/ride out attack" strategy. In such a strategy, the C2-related stresses of assembling authorized political leadership, determining which forces have survived the attack, determining whether an adversary has any remaining nuclear forces, deciding upon the appropriate targets, and communicating the decision to strike – all amidst the wreck of a nuclear catastrophe - are quite significant.

As to what Pakistan has or desires to acquire vis-à-vis nuclear C2, there is very little information available in open literature. Perhaps Pakistan is a prime example of what Peter Feaver has in mind when he admits that

> "Reliable data on existing or developing systems of command and control in emerging nuclear nations are scarce…Command and control has one unavoidable drawback as a level of analysis: there is virtually no reliable information available about command and control in proliferating countries…Credible information on the current situation in proliferating countries, many of which seek to hide the very existence of their nuclear programs, is [extremely] scarce."[52]

However, if Feaver's theoretical analysis of the role of civil-military relations in determining the type of nuclear C2 (assertive or delegative) holds true, there is at least some hope that the Pakistani military government has enforced strict assertive (fail-safe)

control over the country's nuclear arsenal.[53] Others like Gregory Giles are not sanguine, pointing to the country's lack of strategic depth lending to a more delegative (fail-deadly) form of nuclear C2.[54] The key here is that Pakistan's nuclear C2 system may well leave a lot to be desired. Certainly one can assume that if relatively well-off India hesitates before investing in an extensive C2 system, certainly cash-strapped Pakistan is no better off.

The debate on the extent of a small nuclear arsenal's information flow requirements needs much more objective analysis[55] but for the moment one suspects that India and Pakistan will aim for a low-cost C2 system or at least make it the last of their priorities. However, building a C2 system "on the cheap" is short-sighted. The problem in using any cheap fix to an inherently complex problem is that it would lend itself to a C2 system which deploys mated weapons to the field and dangerously pre-delegates launch/detonation authority to lower levels than conditions would warrant. In short, opting for the positive/delegative control option vice the preferred negative/assertive stand might make budgetary sense, but this is strategically bankrupt. The dangers of an unauthorized nuclear exchange would then grow exponentially.

Finally, there is a mixed record with regard to the elements which support and in turn are supported by nuclear C2: the decision-making process and exercises of the nuclear control system. India has moved far ahead of Pakistan. Despite some murmuring by the military to play a larger role in nuclear issues, India enjoys solid and professional civil-military relations. India clearly places national command authority for nuclear weapons under the Prime Minister and Minister of Defence.[56] Conversely, Pakistan suffers from historically poor civil-military relations which in turn pose problems for who is in charge of the nuclear arsenal. While Pakistani officials have stated that there is now a national

command authority, one senses that the senior military leadership – no matter how well-respected or effective, but still very hawkish, unelected and unaccountable to the people – has a major role, if not *the* major role in deciding when to press the nuclear button.[57] The key is that no one in the West, in India or perhaps even in Pakistan itself knows who is the ultimate decision maker in Islamabad's nuclear affairs. The worst time to resolve this issue is when internal/external tensions increases and the potential for conflict becomes very real.

Turning to the issue of nuclear C2 exercises, an unclassified paper would not be the venue to analyze any foreign exercises, if indeed any have taken place. To date, there is no open source reporting on the topic. Still, there is a solid argument for the periodic and publicly pre-announced testing of one's nuclear C2 system. Nuclear command exercises can work out problem areas before any nuclear weapons are operationally deployed. Command post exercises performed when tensions are relatively low can reassure oneself of one's ability to exercise strict control of nuclear forces. Using either press releases, controlled leaks or double agents, results of such exercises can convince an adversary of one's ability to steer the nuclear juggernaut, thus reinforcing deterrence. For example, if Pakistan can no longer assuage India by keeping its weapons unassembled, then there is some value to demonstrate to leaders in New Delhi that Islamabad's negative/assertive nuclear C2 mechanisms work. An effective nuclear C2 system would tell India that there is a greatly lessened possibility of accidental and inadvertent weapons release and reassure its leadership that there is a steady hand at Pakistan's nuclear helm.

Where the United States Can Make a Difference vis-à-vis South Asian Nuclear C2

To what degree should the United States provide India and Pakistan with assistance to develop negative/assertive C2? Ultimately, the decision as to which element of C2 to share hinges on two issues: will the system guard against the possibility of an accidental, inadvertent or unauthorized detonation of a nuclear weapon or will the system also significantly enhance the capability to engage in a nuclear war-fighting vice deterrence-only posture? In some cases, the call is easy to make but in many others there is a great deal of uncertainty. There are very few if any pure deterrence/safety/security only-C2 systems.

Turning first to nuclear weapons safety and security safeguards, as argued earlier it appears that neither India nor Pakistan currently have adequate safeguards in place. Provision of various safety and security safeguard technologies would greatly reduce the risk of a nuclear weapon being stolen, launched by an unauthorized person, or detonated accidentally on one's own territory. Such improvements do nothing to improve the effectiveness (e.g. probability of launch, probability of arrival, probability/size of detonation) of the weapon and should be acceptable under current arms control agreements. In a series of candid, off-the-record bilateral talks, the United States could brief India and Pakistan in full on the details of American procedural (e.g., proper handling, storage, transport, training, education, two man rules) and personnel (e.g. the Personnel Reliability Program) nuclear safety measures. The next step would be to discuss and demonstrate in the United States the various types of physical safety measures for nuclear weapons storage sites. If needed, the United States could also establish a Nunn-Lugar type arrangement for improving South Asian nuclear weapons storage and transport.

A more controversial step would have the United States provide both countries with nuclear weapon design information which enhances safety and security (e.g. component separation, one-point safety, environmental sensing devices, permissive action links, fire resistant pits, insensitive high explosive, enhanced nuclear detonation safety system)[58] but not weapons yield or delivery accuracy. When South Asian and nuclear experts write of sharing nuclear C2 systems, they suggest this option most often, if at times reluctantly and usually with only a vague definition (when one is given) of what they mean by C2.[59]

Some nuclear weapon design material might already be declassified; however the bulk should remain highly classified but releasable to India and Pakistan. There are several reasons for this. First, it serves as a caution to the South Asian states not to release the information or technology any further and helps keep it out of the hands of other nuclear proliferators. Two, it can show each country that the other is getting the same information and not getting a leg up on the competition. Three, it shows the trust and high level of concern with which we hold our counterparts in Indian and Pakistani nuclear/military organizations. As one expert on security classification issues notes, "[security classifications] can be very easily adjusted downward if the United States wishes to share that information with another…the upper limit of what is released to another nation represents the amount of trust."[60] The trust issue is the most vital element in the equation. The option of passing only unclassified data as some have suggested[61] is not only bureaucratically narrow-minded but quickly implies there is a low level of trust between the US and the country in question. Opting to declassify much data prior to

releasing it as others have recommended[62] has the undesired effect of its unwanted release to other proliferants.

If there is still some unease about releasing too much data and technology too soon, the United States could at least pass along earlier versions of its PAL and other weapons security designs. The United States could also first broach the subject and associated details very discretely or through semi-official channels. There seems to be some interest by Pakistan in obtaining such safeguard technology from the United States, judging by their mentioning of the topic to the Air War College contingent.[63] Perhaps India's interest would be piqued if they learned that the United States was formally engaging Pakistan on this matter.

Moving on to improving their intelligence and early warning networks, we must be more selective in what should and should not be shared with India and Pakistan. It would appear prudent to provide both countries with a regular flow of selected data on the other as a means of confidence building. A primary method would be the 24/7 provision of missile launch data to buttress their own bilateral agreement on missile test notifications. The early warning data sharing agreement signed between the United States and Russia serves as a good example. Ironically, the data flowing to both countries around the clock would largely show that no launch activity was underway; in other words, no news is good news and thus tensions and distrust would lessen considerably. As a further step towards strategic stability, both countries should enter into agreements to not attack each other's warning and surveillance networks since each has an interest in protecting, if not outright assisting "[the other's] warning system's ability to demonstrate that an attack is *not* in progress…explicit arrangements should be made for mutual protection of these assets."[64]

Our provision of intelligence, particularly imagery of key bases and possible missile launch sites, is more problematic. Some measures meant to improve their intelligence shortfalls will also improve their capability to engage in a deliberate nuclear exchange. For example, it appears reasonable to provide India and Pakistan regular satellite and on-site surveillance of the other's key air and military bases where missiles or nuclear-armed aircraft might be deployed.[65] Certainly such information would lessen their tendency to misinterpret data or act on incomplete data and worst case assumptions. This is an area in which both India and Pakistan have expressed interest, if not also assumed United States support in an hour of need.[66] If anything, it would restore the intelligence balance between the two states given what satellite imagery India will soon be able to provide for itself and what Pakistan is ill-equipped to afford on its own. Barring the unlikely agreement by either country to permit neutral observers (or an Open Skies-style arrangement) on or near its nuclear-capable bases, the only option is satellite surveillance where the US has a clear advantage.

However, we should take great care on the imagery of what bases/areas given to either country, the quality of that imagery, and its timeliness. The United States should not be a blithe and impartial provider of intelligence to India and Pakistan. At times we would have to be very selective in what is released in an effort to keep tensions from boiling over since not all imagery intelligence support will automatically enhance stability. For example, if either country chooses mobility or concealment/deception measures to provide a degree of survivability to its nuclear force, the United States must not reveal that force's whereabouts to the other country. Additionally, the United States must be very careful not to reveal too much about the capabilities of its collection systems since this information

can and has been turned against it.[67] Perhaps greater mileage might be obtained by engaging with the Indian and Pakistani military intelligence services in a training program to improve the quality of their analysis. The goal here will be to foster a more professional, less adversarial or biased relationship with their own policymakers.

Moving on improving nuclear-critical information flow, the dilemma over what to share without unduly strengthening their capability to commence a nuclear exchange becomes almost unsolvable. As argued earlier, neither country appears to have a reliable system to flow nuclear weapon-related information and decisions. Nevertheless, any significant C2 system serves both deterrent and war-fighting functions. Short of abandoning the Non Proliferation Treaty (NPT) entirely, the United States cannot provide support for one function without supporting the other. At most the United States can engage both countries in candid discussions of C2 theory (e.g. concepts, doctrine, procedures and organizations), emphasizing its concerns not to deploy weapons at least until a robust C2 system is in place, and making a case for a more stabilizing negative/assertive information flow network. Our provision of any advanced nuclear-critical information systems or technologies is too problematic and politically explosive.

Finally there is the issue of national command authority and nuclear command and control exercises. Rather than deny India's and Pakistan's *de facto* nuclear status, the United States should openly engage them in these critical issues, one fellow nuclear state to another. This does not imply that the United States necessarily welcomes their nuclearization but it also means that it does not ignore the fact, hoping it will go away. The United States should engage India and Pakistan as soon as possible in a bilateral, candid and non-judgmental dialogue to address the important role of constitutionally

legitimized authorities to decide upon nuclear conflict. The purpose is not to cast aspersion on their domestic political situations but rather to stress the need for a clear, consistent and preferably civilian-led nuclear chain of command. We should also outline our own rationale and methodology of exercises to test the system and involve those political authorities. In addition to official and unofficial discussions, there would be great benefit in inviting India and Pakistan to witness American exercises of its safety and security systems and its major strategic command post exercises. Unlike all the other C2-related issues above, here there may be some benefit in a multilateral exchange, involving India and Pakistan *simultaneously*.

Obstacles to Sharing Nuclear C2

This paper does not assume that full provision of nuclear C2 would solve all the tensions in South Asia. It simply acts as a significant brake for crisis management now that India and Pakistan have gone nuclear. Nor does it assume that sharing C2 would be an easy effort. However much one accepts that a negative/assertive C2 system provided by the United States would help India and Pakistan achieve nuclear crisis stability, there are significant obstacles in taking such a radical move.

In the first place, India and/or Pakistan might not accept United States assistance. Pakistan has been an on-again, off-again ally and India welcomes a closer relationship with the sole remaining superpower. However both display little trust of the United States with regard to nuclear matters, given the history of American opposition to their nuclear programs. Allegedly they already once rebuffed American offers of nuclear C2 assistance since there were too many preconditions attached (e.g. pledges not to deploy nuclear

weapons).[68] They may show a deep resistance to any form of negative safeguards technology (particularly weapons safety) for fear it might give us some form of veto control over their weapons. They may also fear US assistance as being a convenient cover for espionage against their nuclear arsenals.[69] Additionally, we may be faced with countries which are simply not interested in adopting a mini-American style nuclear safeguards arrangement and instead truly believe, as did the Indian Prime Minister Vajpayee, they do "not need to replicate [United States] command and control structures."[70]

Developing their trust and convincing them that there are significant C2 shortfalls in their nuclear arsenals are very important preliminary steps. To start, we should initiate candid and off the record bilateral talks with our South Asian counterparts in the militaries and government weapons labs.[71] American academics known to have the ear of senior policymakers and who specialize in nuclear C2 issues can be useful if official/semi-official contacts are hard to start. Certainly the candor of senior South Asian officials as to their own deficiencies in intelligence and missile warning and their subtle suggestions for American support in the former arena offer an initial opportunity to begin the dialogue on nuclear C2. From there our nuclear experts can frankly discuss the rationale for our nuclear safeguard/C2 technologies and procedures, explain the various tests of these systems, demonstrate and eventually share specific weapons safeguard systems and/or designs. In this manner, India and Pakistan will gradually trust our intentions and begin measures to field comprehensive nuclear C2.

Assuming we can convince India and Pakistan of our sincerity, dependability and even-handedness[72] in providing nuclear C2, there are many national and international

constraints - legal or otherwise - on such assistance. Various United States domestic laws (e.g. the 1954 Atomic Energy Act) and international treaties (e.g. Article 1 of the Non-Proliferation Treaty) impose serious restraints against any nuclear weapons assistance. However, the legal hurdles to such assistance may not be as high as they would appear.[73] In some cases, there would be no violation of legislative intent (i.e. the spirit vice the letter of the law). According to one study, "as long as proposed nuclear assistance does not contribute to the building of a new weapon or an increase in the destructive ability of existing weapons, and [will] make existing weapons more safe and secure, assistance does not appear to violate the legislative intent of the Arms Control and Non-Proliferation Act of 1994."[74] Additionally, our provision of negative/assertive nuclear C2 supports the broader goals stated in the NPT's preamble "to make every effort to avert the danger of [nuclear] war and to take measures to safeguard the security of peoples."[75] This guarded approval of a more restrictive provision of nuclear C2 affects what types of assistance we could permissibly share with India and Pakistan. It does not necessarily prevent C2 assistance from taking place. US laws and international treaties may act as speed bumps and not road blocks to such support.[76] Finally, in the same manner as the Bush Administration aims to "move beyond the constraints"[77] of the ABM Treaty, so too might the NPT be "restructured to allow for international cooperation in nuclear safety technology."[78]

Still, given India and Pakistan's predilection for risky behavior (whether or not this now has been made worse by their nuclear arsenals), some have argued that the provision of nuclear C2 only encourages them to assemble and deploy their weapons. In essence, the current lack of safety/security safeguards acts as a self-deterrent to the weapons'

deployment. The provision of these safeguards would be self-defeating, leading to a situation more dangerous than if nothing had been done in the first place.[79] Certainly there is that danger but in the end as has been argued earlier, the weapons will eventually be assembled and deployed, with or without C2 safeguards. The oft-used metaphor in this case is that of teenagers and condoms: "one prefers that it not happen, but if it goes on anyway, there are strong incentives for assuring that it happen safely."[80] On a more pessimistic note, one could also compare providing nuclear C2 safeguards to handing out clean needles to drug addicts in order to prevent AIDS, accepting a lesser social evil to avoid one more disastrous.[81] Again, the preference is that the behavior in question not occur, but if it is perhaps inevitable, that it at least occur safely. In short, "other things being equal, no proliferation is preferable to safe proliferation, but in any event, safe is better than unsafe proliferation."[82]

The final obstacle lies in whether "managed proliferation" will weaken the international taboo against nuclear proliferation, raising fears that such "neo-non-proliferation negativism" will in the end "erode one of the most important pillars of American foreign policy."[83] Others echo the fears of Leonard Spector that *any* assistance whatsoever to a new nuclear state would only encourage others to take the same path.[84] Certainly the NPT has taken a great deal of hits lately, from its non-adherence by Iraq and North Korea, the heightened relevance of nuclear weapons in American and Russian defense planning,[85] and the weakening of US sanctions against South Asia.[86] However, given the deep-seated reasons behind India and Pakistan's decision to develop nuclear weapons, why would our reluctant acceptance of the nuclear *fait accompli* in South Asia incite another nation to begin the onerous decades-long process of developing nuclear

weapons? It too would have to weigh the costs versus benefits of nuclear proliferation. The nuclear taboo should remain if we portray India and Pakistan as the exceptions to be begrudgingly accepted into the nuclear club, not praised or emulated. For example, India should not move to the front running for a potential sixth permanent UN Security Council seat solely by virtue of its nuclear prowess. Such a "reward" should go to those who eschew (Japan) or abandoned (Brazil, South Africa, Ukraine) nuclear weapons.

On a more pragmatic level, consider the alternatives: what arms control options vis-à-vis South Asia would a pure non-proliferationist give a policymaker? *Some* options (e.g. mediation, persuasion, unilateral security guarantees, multilateral security guarantees, economic assistance, an end to aid, political and economic sanctions, and preemptive military strikes) may have been considered. *All* that have been tried have failed. Would a principled opposition to any assistance do anything to reduce the potential of an inadvertent or accidental nuclear exchange in South Asia? At most, they give us the cold comfort to say "I told you so" following a nuclear exchange. There are few good options when faced with states hell-bent on developing nuclear weapons. Instead, there is the need to make the most of a bad situation and come up with another approach. The United States is forced to decide whether to condemn, strike or assist. As Gregory Giles writes, "for all the risks raised by assistance on nuclear weapons safety and security, the dangers of inaction by the international community are even greater…Where rollback is a less realistic expectation, safety and security assistance should take a more active role."[87] Sharing selected aspects of nuclear C2 to achieve a negative/assertive system is a viable and promising option.

Conclusion

The United States should transfer – free of charge - *selected* systems, procedures and technologies to *both* India and Pakistan in order to create a "fail-safe" negative/assertive nuclear C2 apparatus. The purpose of this transfer is to ensure strict control of their arsenal and reduce the risk for an inadvertent/accidental launch or a launch on warning posture. The ultimate goal is to give both countries a strategic pause to establish arms control agreements and confidence building measures. They need the "time" and "distance" to back away from the nuclear precipice. We have very few alternative options available.

This policy is only one step towards avoiding a nuclear exchange on the sub-continent. The preferred approach should still be to dissuade India and Pakistan from operationalizing and deploying their nuclear weapons. "Roll-back to zero" will remain a distant if unattainable goal. But when the inevitable deployment of nuclear weapons occurs, they - and we - will have some protection via comprehensive nuclear C2. Since India and Pakistan cannot put the nuclear genies back into their bottles, they must master what they unleashed. The United States must do what it can to help this process. To only hector South Asia on the dangers of nuclear weapons is fruitless and turns a blind eye to friendly nations in need, whether they would like to admit it.

There are no panaceas recommended here, just practicable solutions to begin to untangle thorny problems. As the countries concerned implement these measures, they and the United States must realize that these C2 solutions are only stop-gap measures. They can be bypassed,[88] can fail,[89] are only as robust as the societies in which they are imbedded,[90] and could lead a country's leadership to be over-confident in its (and its

adversary's) ability to control the nuclear juggernaut.[91] Given this, they should make serious overtures to reducing tensions, building trust and resolving core disputes. India and Pakistan must implement realistic and verifiable confidence building measures. They must agree on a ban on further nuclear and missile tests. They should follow-up on cease-fires and military withdrawals along the Line of Control[92] with sincere multilateral negotiations to cut the self-created/self-tightening nooses around their necks. They must abandon their all-or-nothing positions vis-à-vis Kashmir, to no longer identify Kashmir with their core and mutually exclusive identities.[93]

The UN Security Council's Permanent 5 must aggressively lead an impartial effort to break the impasse over the Kashmir issue, "the root cause of insecurity and instability in South Asia."[94] This is not done in a quixotic effort to de-nuclearize India and Pakistan. Rather it is meant to undo and reverse the intense hostility which is warping their bilateral relations. UN involvement can provide top cover vis-a-vis the domestic political outcry resulting from a compromise solution,[95] whether international protectorate, independence, partition, or union. Any lasting solution in Kashmir must factor in the desires of those most liable to be caught under the wheels of a nuclear juggernaut: the Kashmiri themselves. In the end, all of us - the United States, India and Pakistan - must have the wisdom to discover the truth, the courage to choose it, and the strength to make it prevail.

Endnotes

[1] Andrew Koch, "India, Pakistan: Nuclear Arms Race Gets Off to a Slow Start," Jane's Intelligence Review 13 (January 2001), 36-40.

[2] Pamela Constable, "Missile Defense Plan is Uniting U.S., India," Washington Post (May 20, 2001) at http://ebird.dtic.mil/May2001/e20010521missile.htm.

[3] Shireen M. Mazari, "Comment: Nuclear Safety vs. Nonproliferation," Strategic Studies 20 (Autumn 2000), 6.

[4] For example, on whether India exploded a thermonuclear device, see T. S. Gopi Rethninoraj, "Indian Blasts Surprise the World, but Leave Fresh Doubts," Jane's Intelligence Review 10 (July 1998), 20; and, R. Jeffrey Smith, "Analysts Skeptical of Pakistan's Claims," Washington Post, May 29, 1998, 33. Criticisms of the series of Pakistani tests may be found in Rethninoraj, 21; and, W. P. S. Sidhu, "High Price Expected for Pakistan's One-upmanship," Jane's Intelligence Review 10 (July 1998), 28-29.

[5] For example, see Amit Gupta, "India's Draft Nuclear Doctrine," The Round Table (July 2000), 363; Pratas Bhamu Mehta, "India: The Nuclear Politics of Self-Esteem," Current History 97 (December 1998), 405; Francois Heisbourg, "The Prospects for Nuclear Stability between India and Pakistan," Survival 40 (Winter 1998-1999), 80-81; Amit Gupta, "South Asian Nuclear Choices: What Type of Force Structures May Emerge?," Armed Forces Journal International (September 1998), 26-27; Maroof Raza, "Nuclear India's Doctrine of Deterrence," Indian Defence Review 14 (July-September 1999), 37; and, W. P. S. Sidhu, "Pakistan Puts Its Nuclear Cards on the Table," Jane's Intelligence Review 10 (July 1998), 26.

[6] See P. R. Chari, "India's Nuclear Doctrine: Confused Ambitions," The Nonproliferation Review 7 (Fall-Winter 2000), 123; Tehmina Mahmood, "India and Pakistan's Nuclear Explosions: An Analysis," Pakistan Horizon 52 (January 1999), 42-43; and, Sumit Ganguly, "Explaining Indian Nuclear Policy," book review, Current History 98 (December 1999), 438.

[7] Other commentaries on the motivation behind India's nuclear weapons program include Jaswant Singh, "Against Nuclear Apartheid," Foreign Affairs 77 (September-October 1998), 49; Sumit Ganguly, "India's Pathway to Pokhran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program," International Security 23 (Spring 1999), 149; C. Raja Mohan, "India's Nuclear Weapons and the Asian Balance," Indian Defence Review 13 (July-September 1998), 19; and, Rahul Bedi, "Interview [with] George Fernandes," Jane's Defence Weekly 29 (1 July 1998), 32

[8] There are several analyses on Pakistan's nuclear rationale, to include Samina Ahmed, "Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices," International Security 23 (Spring 1999), 178-179 and Abdul Shakoor Khakwani, "Nuclear Proliferation in South Asia: A Case for the Regional Consensus," Pakistan Horizon 47 (July 1994), 88-90.

[9] Robert Karniol, Interview [with] Senator Sartaj Aziz," Jane's Intelligence Review 30 (25 November 1998), 32. Also see Farzana Shakoor, "Nuclearization of South Asia and the Kashmir Dispute," Pakistan Horizon 51 (October 1998), 67, 73-74; and, Mahmood, "India and Pakistan's," 50.

[10] Devin T. Hagerty, "South Asia's Nuclear Balance," Current History 95 (April 1996), 169.

[11] See the cogent comments on the difficulties of "un-proliferation" in George Perkovich, India's Nuclear Bomb: The Impact on Global Proliferation (Berkeley: University of California Press, 1999), 445.

[12] Ramseh Chandran, "Clinton Finds Line of Control Most Dangerous Place in World," Times of India (March 11, 2000), 1.

[13] Scott D. Sagan and Kenneth M. Waltz, The Spread of Nuclear Weapons: A Debate (New York : W.W. Norton, 1995), 45.

[14] See Hagerty, "South Asia's Nuclear Balance," 166-167; William C. Martel and William T. Pendley, Nuclear Coexistence: Rethinking U.S. Policy to Promote Stability in an Era of Proliferation, Air War College Studies in National Security No. 1 (Maxwell AFB, AL; Air University Press, 1994), 23, 75-76; and, K. V. Gopalakrishnan, "Are Nuclear Weapons That Bad?," Indian Defence Review 11 (July-September 1996), 30-31.

[15] Lewis A. Dunn, "What Difference Will It Make?", in Robert J. Art and Kenneth N. Waltz, eds., The Use of Force: Military Power and International Politics, 4th ed. (Lanham, Maryland: University Press of America, 1993), 516.

[16] At least during the time of the Soviet state; concerns over internal Russian chaos helped drive the Nunn-Lugar program.

[17] See Martel/Pendley, 34-35, 76-77; Joseph S. Nye, Jr., "New Approaches to Nuclear Proliferation Policy," Science 256 (May 29, 1992), 1293; and, Mario E. Carranza, "An Impossible Game: Stable Nuclear Deterrence After the Indian and Pakistani Tests," The Nonproliferation Review 6 (Spring-Summer 1999), 12. However, the reduction of pressures for launch on warning could not completely eliminate the conscious choice to continue with a forward leaning posture. As pointed out by Bruce Blair, "[despite differences in United States and Soviet C2 philosophies], there exists two common denominators that have profoundly shaped the nuclear postures of both states: command vulnerability and launch on warning. The former drove both command systems to adopt the latter. Rapid reaction, or literal launch on warning…created the greatest danger of nuclear inadvertence in a crisis." (See Bruce G. Blair, The Logic of Accidental Nuclear War [Washington, D.C.: The Brookings Institution, 1993], 113-114) There are still limits and cautions to be learned if India and Pakistan were to adopt a US-style C2 system.

[18] Francois Heisbourg, quoted in Carranza, 20.

[19] Carranza, 15; Kanti Bajpai, "The Fallacy of an Indian Deterrent," in Amitabh Mattoo, ed., India's Nuclear Deterrent: Pokhran II and Beyond (New Delhi: Har-Anand Publications, 1999), 178-179; C. Uday Bhaskar, "The May 1990 Nuclear 'Crisis': An Indian Perspective," Studies in Conflict and Terrorism 20 (October-December 1997), 325; Jasjit Singh, "The Wars That Never Were," India Today (New Delhi), April 12, 1996; P.R. Chari, 127; and, Prasun K. Sengupta, "The Defence of Pakistan," Asian Defence Journal (July 1999), 28.

[20] Seymour M. Hersh, "On the Nuclear Edge," New Yorker (March 29, 1993), 56-73. Admittedly other commentators have raised objections to this interpretation of both incidents. For example, Hagerty cites numerous American and South Asian officials involved in the 1990 crisis that the nuclear aspect was over-exaggerated by American officials. (See Devin T. Hagerty, "Nuclear Deterrence in South Asia: The 1990 Indo-Pakistani Crisis," International Security 20 [Winter 1995/1996]). The key lesson learned is that what may in fact be myth has now taken on the guise of a seemingly useful bluff.

[21] Ahmed, "Pakistan's Nuclear Weapons," 189-190.
[22] Joseph Cirincione, "The Asian Nuclear Reaction Chain," Foreign Policy (Spring 2000), 127. Also see Hindu, June 1, 1999, cited by Chari, n.27; and, Tehmina Mahmood, "Kargil Crisis and Deteriorating Security Situation in South Asia," Pakistan Horizon 52 (October 1999), 31.
[23] Amit Gupta, discussions with author, 27 April 2001.
[24] Various formal briefings and sidebar conversations between senior Indian military officials and United States Air War College contingent, 5-9 March 2001.
[25] Safeguards include weapon lock-out technologies, communications, intelligence and early warning systems, personnel reliability programs and various standard operating procedures. These are discussed later in the paper.
[26] Stephen J. Cimbala, "Nuclear Crisis Management and Information Warfare," Parameters 29 (Summer 1999), 121-122.
[27] Obviously C2 has a warfighting (e.g. post-deterrence failure) role. Any nuclear arsenal must still be responsive to the needs of the country's leadership in case the unthinkable comes to pass. An overly elaborate set of safeguards would make any arsenal useless, negate any intended deterrent effect on the adversary's thinking, and may even tempt an adversary in launching a preemptive strike against such a self-constrained force. As with all things, nuclear command and control has its darker flip-side: the war-fighting function of a nuclear arsenal, i.e. the dissemination of launch orders by authorized personnel to nuclear equipped forces once deterrence breaks down. The nuclear irony is that to deter (and thus hopefully never be fired in anger), the weapons must be perceived to be able to be quickly released in the event deterrence fails.
[28] Rear Admiral Raja Menon, A Nuclear Strategy for India (New Delhi: Sage Publications, 2000), 241-242.
[29] Any C2 system will inherently have a mix of positive/delegative and negative/assertive controls. Pragmatically, for purposes of mere deterrence, even the most reluctant nuclear weapons state would eschew a "pure" negative/assertive C2 set-up. The US's goal is to lead India and Pakistan to a C2 system in which the positive/delegative mechanisms are subdued.
[30] Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," International Security 17 (Winter 1992-1993), 169-170.
[31] The purpose of such a negative/assertive C2 system is in part to "guard against four dangers: (1) nuclear yield resulting from an accident, (2) deliberate unauthorized release, (3) inadvertent unauthorized release, and (4) hostile seizure." (See Peter Stein and Peter Feaver, Assuring Control of Nuclear Weapons: The Evolution of Permissive Action Links [Cambridge: Center for Science and International Affairs, 1987], 66). A secondary if overlooked purpose particularly pertinent in the South Asian case is for mutual assured reassurance during crises between India and Pakistan. Knowing that there are no rogues in the other's nuclear command chain, believing that the chances for dangerous misunderstandings and misperceptions have been sharply reduced, and accepting that one's own control is unchallenged (from internal or external threats) can play major roles in successful crisis management and de-escalation control. In this sense, even negative/assertive control supports the deterrent function of a nuclear arsenal.
[32] The *real* key issue for making a safe, secure nuclear arsenal is to address the problem of weapon systems vulnerability. This will drive in large measure whether a country opts for a posture favoring preemptive launch, launch-on-warning or launch-under/after-attack. For example, if a state is confident of its ability to ride out an attack, it *might* also retain tight centralized control of its weapons; however, if it fears a decapitating strike against its leadership or an disarming strike against its arsenal, it *will very likely* move to delegating release of the weapons, moving dangerously to first use or launch on warning posture no matter what its doctrine may be. (See Carranza, 12, 18-19). A stable, and thus safe force, requires not just a strict C2 system but also the ability to survive a first strike, delivery systems able to reach their target and penetrate any defenses along the way, a low risk of physical accidents, the capability of a flexible response, and reasonable procurement/operational costs. (See Gregory S. Jones, "From Testing to Deploying Nuclear Forces: The Hard Choices Facing India and Pakistan," RAND/Project Air Force Issue Paper [Santa Monica, CA: RAND, 2000], 1. However, the concept of providing Indian and Pakistan with invulnerable weapon delivery systems (e.g. submarines or hardened silos), technologies or design would be far too radical to reasonably consider. In the absence of such intrinsic force safeguards, it is no small wonder why the United States has pressed India and Pakistan not to assemble or deploy their weapons, i.e. to keep them at a low state of readiness and thus less liable to preemptive use.
[33] For example, the draft doctrine emphasizes an centralized nuclear command organization under civilian control, an extensive intelligence and early warning network, a robust C2 system for continuity of operations and full and redundant safeguards against accidental or unauthorized use. (See "Indian Nuclear Doctrine," reprinted in Indian Defence Review 14 [July-September 1999], 34-35).
[34] Observers such as Gurmeet Kanwal and Rear Admiral Raja Menon have done a great deal of work outlining more specific requirements for India's nuclear arsenal. See Gurmeet Kanwal, "Nuclear Defence: Shaping the Indian Arsenal," Indian Defence Review 15 (Oct-Dec 2000), 36-42; and, Rear Admiral Raja Menon, A Nuclear Strategy for India (New Delhi: Sage Publications, 2000). Work is also slowly proceeding on a hardened command post in New Delhi. (See Koch, 39). Unfortunately, far less open source literature and debate is seen vis-à-vis Pakistan's nuclear and related C2 requirements.
[35] In the words of Brigadier Ali Halid, the Director General of the Strategic Plans Division and a senior Pakistani officer responsible for the country's nuclear program, during 13 March 2001 discussions with the United States Air War College

contingent, "Pakistan has a robust C2 system for controlling and safeguarding its nuclear weapons." His briefing on further details matched many of the observations made by Koch, 39. Unfortunately, the Pakistanis politely demurred on providing copies of their briefing slides to the author.

[36] Bruce G. Blair, Strategic Command and Control: Refining the Nuclear Threat (Washington, D.C.: The Brookings Institution, 1985), 302-303.

[37] Separation of the warheads from delivery vehicles as well as joint military/civilian custody of the trigger mechanism for reasons of safety is the current Indian approach according to Kanwal, "Nuclear Defence," 40-41.

[38] Apparently, Pakistan has now made this step by placing all its "strategic organizations" under control of its NCA. See Koch, 39.

[39] Koch, 39.

[40] In the words of Geoffrey Forden, a specialist on Russia's early warning system, "the value of an early-warning system is not so much that it doesn't give false alarms, but lets you know that benign events are benign." (See Jonathan S. Landay, "A Decrepit Russia Raises Nuclear Fears," Detroit Free Press [May 2, 2001], 1).

[41] It is the author's opinion that a reliance on less timely espionage and HUMINT collection does not meet with the precise and time-sensitive demands of a potential nuclear conflict, demands which can best be served by technical (IMINT, SIGINT, MASINT) collection. However, according to Brigadier Syed Khalid, Director of Military Intelligence, Pakistan Army HQs Staff, Pakistan is most heavily reliant on HUMINT for indications of Indian activity. 13 March 2001 discussions with United States Air War College contingent. While HUMINT can give good insights to an adversary's intentions, it suffers from very slow dissemination and extreme subjectivity.

[42] Hersh, 59-60; and, Desmond Ball, Signals Intelligence (SIGINT) in South Asia: India, Pakistan, Sri Lanka (Ceylon), Canberra Papers on Strategy and Defence No. 117 (Canberra, Australia: The Australian National University, 1996), 28-29, 32, 36-37.

[43] S. Ramkumar, "Kargil Failure: An Opportunity for Intelligence Reform," Indian Defence Review 15 (January-March 2000), 28-29; Maj. Gen. Afsir Karim (retired), "Kargil: Quantifying Failure and Success," Indian Defence Review 15 (April-June 2000), 31-32; and, Air Marshal B. D. Jayal (retired), "The Kargil Review Committee Report: A Mindset Frozen in 1962 Era," Indian Defence Review 15 (April-June 2000), 35-36.

[44] Kanti P. Bajpai and others, eds., Brasstacks and Beyond: Perception and Management of Crisis in South Asia (New Delhi: Manohar Publishers, 1995), 105.

[45] Farah Zahra, "Pakistan's Road to a Minimum Nuclear Deterrent," Arms Control Today 29 (July-August 1999), 3; Jones, 4-5; Menon, 248; and, Bajpai, in Mattoo, 171. India's absence of a missile warning capability was reconfirmed in discussions with senior officials at HQs Western Air Command. 5 Mar 2001 discussions with United States Air War College contingent.

[46] This is worsened by the vulnerability of their weapon systems, the questionable survivability of their current C2 system, and the fragile nature/dubious political authority of their governments. Still, a robust intelligence and early warning network can go only so far, especially if either side has a profound distrust of the other's intentions. As Bruce Blair noted, "both the United States and Soviet command and control systems strained to detect an attack. Both were also strongly disposed to give the launch orders, unlock codes, and targeting instructions before definitive evidence of massive damage had accumulated…The danger of inadvertent war that stemmed from this stance was greater than has generally been recognized. The danger was compounded by two features of the United States system. First, the United States posture depended on a warning system that…was more prone to infer an enemy attack from ambiguous evidence. Second, United States contingency plans rapidly and irreversibly dispersed discretionary authority to order SIOP implementation in the event of initial disruption to the normal chain of command." (See Blair, The Logic of Accidental War, 217.)

[47] If there were one matter on which both senior India and Pakistani officials acted in concert, it would be their extreme reluctance to discuss any elements of this specific C2 issue with the author or any other member of United States Air War College contingent in March 2001. However, Gurmeet Kanwal, a noted Indian military analyst on nuclear issues, just recently outlined a recommended methodology to securely pass authorized orders to launch nuclear weapons via a two-part message. (See Kanwal, "Nuclear Defence," 40). Whether this has or will be implemented is of course unknown, but it shows the seriousness with which the Indians are handling their nuclear arsenals. It is likely that the Pakistanis are similarly engaged in establishing a strict C2 requirements. Whether either can make this happen is another matter altogether.

[48] George Perkovich, "A Nuclear Third Way in South Asia," Foreign Policy 91 (Summer 1993), 88.

[49] Scott D. Sagan, The Limits of Safety: Organizations, Accidents, and Nuclear Weapons (Princeton: Princeton University Press, 1993), 266.

[50] For concerns of the high cost of a C2 system, see Ahmed, "Pakistan's Nuclear Weapons," 199; and, Heisbourg, 82. For a more benign view of India's C2 requirements, see Menon, 235; Bajpai, in Mattoo, 172-173; Kak, in Singh, 270-271, 279-280, 283-284; and, Feaver, "Command and Control," n. 6.

[51] Quoted in Kanwal, "Command and Control," 57. Also see Menon, 257; and, Perkovich, "A Nuclear Third Way," 88.

[52] Feaver, "Command and Control," 160, 162. Also see Bajpai, in Mattoo, 172, 174 for an admission of how little is truly known about the Indian C2 system.

[53] Feaver, "Command and Control," 178, 180.
[54] Gregory F. Giles, "Safeguarding the Undeclared Nuclear Arsenals," The Washington Quarterly (Spring 1993), 178; and, Carranza, 12, 18-19.
[55] To date there has been only one work which addresses the specific C2 needs of a small nuclear arsenal, supporting its argument with a solid conceptual framework. Jordan Seng, in "Less is More: Command and Control Advantages of Minor Nuclear States," Security Studies 6 (Summer 1997), argues quite convincingly that minor nuclear powers "will enjoy greater organizational simplicity that stems from the small size and simple composition of their nuclear arsenals" and thus require less extensive C2. While he overestimates the capability of such a state to use concealment to protect its forces and thus drive down the C2-related costs of a launch on warning posture, he does agree that some form of nuclear-specific C2 system is nevertheless required.
[56] Further details can be found in India's draft nuclear doctrine ("Indian Nuclear Doctrine," 34-35). Detailed recommendations on the command authorities (e.g. multiple command posts, military organizations dedicated to planning/operating strategic nuclear weapons) can be found in Kanwal, "Nuclear Defence," 39-40; and Menon, 253, 258, 261, 270.
[57] Samina Ahmed, "The (Nuclear) Testing of Pakistan," Current History 97 (December 1998), 410.
[58] John D. Frketic and others, "Proliferation Management in the Third Nuclear Age: A Strategy and Rules of Engagement," Spring 1996 (?), unpublished manuscript [photocopy], John F. Kennedy School of Government, 47-50.
[59] See Dan Caldwell, "Permissive Action Links: A Description and Proposal," Survival 29 (May-June 1987), 234-235;, 183-184; Peter D. Feaver and Emerson M. S. Niow, "Managing Nuclear Proliferation: Condemn, Strike, or Assist," International Studies Quarterly 40 (June 1996), 210; Heisbourg, 86-89; Feaver, "Command and Control," 182-183, 186; Hagerty, "South Asia's Nuclear," 169-170; Toby F. Dalton, "Toward Nuclear Rollback in South Asia," Current History 97 (December 1998), 417.
[60] Robert E. Rehbein, Informing the Blue Helmets: The United States, UN Peacekeeping Operations, and the Role of Intelligence, Martello Papers No. 16 (Kingston, Ontario: Queen's University, 1996). 70. No doubt the use of a map briefing board prominently marked "SECRET" to explain the Line of Control from Pakistan's viewpoint to the US Air War College contingent had this as an ulterior motive.
[61] Hagerty, "South Asia's Nuclear Balance," 169-170.
[62] Giles, 180.
[63] Brigadier Ali Halid,13 Mar 2001, discussions between Joint Staff Headquarters (Pakistan) officials and United States Air War College contingent.
[64] Bruce G. Blair and John D. Steinbrunner, The Effects of Warning on Strategic Stability, Brookings Occasional Papers (Washington, D.C.: The Brookings Institution, 1991), 39.
[65] Dalton, 417.
[66] Air Vice Marshall Patney, Vice Chief of Air Staff (India), discussions with senior United States Air War College contingent, 5 March 2001. Also sidebar discussions with senior members of the Indian Air Force Assistant Chief of Staff/Intelligence and author, 5 March 2001. In Pakistan, this too was a common refrain heard by the author, known by his hosts to be an intelligence officer, in formal and informal discussions with Pakistani senior officials.
[67] For example, in 1995 the US confronted New Delhi with proof from its spy satellites that India was preparing a nuclear test; in 1998 armed with this information, Indian scientists were able to hide the preparations for the series of tests at Pokhran. (See Rethninoraj, 19, 21.)
[68] Koch, 39. However, if the United States were to resign itself to the fact that the weapons will one day be deployed no matter what, then it could make the offer again without overly intrusive or restrictive preconditions (except for no third party transfer).
[69] Steve Coll, "The Man Inside China's Bomb Labs," Washington Post (May 16, 2001) at http://ebird.dtic.mil/May2001/e20010516theman.htm. Coll's point on an American scientist's access to China's nuclear weapons labs and alleged spying on behalf of the US intelligence community is germane here.
[70] Quoted in Gurmeet Kanwal, "Command and Control of Nuclear Weapons," Indian Defence Review 13 (April-June 1998), 57.
[71] Although not necessarily focused on nuclear C2 issues, there has recently been a revival of high level US-Indian military-to-military talks following a lapse of almost 3 years. In the words of Lalit Mansingh, India's Ambassador to the United States, "the [nuclear] genie can't be put back in the bottle. We have to get beyond and look at common strategic interests." (See Ben Barber, "U.S., India Restore Cooperation by Militaries," The Washington Times [May 3, 2001-, 1.). Although the United States has several additional outstanding issues with Pakistan (e.g. recognition of the Taliban government in Afghanistan, martial law in Pakistan), we gravely risk further isolating Pakistan and risking instability if we do not make similar high-level military-to-military overtures to Islamabad. The March 2001 visit to Pakistan by the US Air War College, after a three year hiatus, was a welcome beginning, but much more is needed and soon to reengage with our Pakistani counterparts and rebuild their trust and confidence (especially among the more skeptical younger officers).
[72] Great care must be taken to avoid the misperception that the US is favoring one country over the other. Recent events may cause Pakistan to believe the warming relations between the United States and India are to its disadvantage. As

much as many opinion makers hold the image of Pakistan as a "nearly bankrupt nation with…a military government and an expanding nuclear arsenal is drifting towards religious extremism" (See Barry Bearak, "Death to Blasphemy: Islam's Grip in Pakistan, New York Times [May 12, 2001] at http://www.nytimes.com/_2001/05/12/world/12PAK.html) and come to relish stronger ties with India vis-à-vis defense issues (see Celia W. Dugger, "Rare Praise from India on U.S. Defense, New York Times [May 6, 2001] at http://www.nytimes.com/_2001/05/13/world/13INDI.html), nuclear C2 should be provided in an unbiased and strings-free manner.

[73] The author is not a lawyer so *caveat emptor*.

[74] See Frketic, 22.

[75] Preamble to the Non-Proliferation Treaty, reprinted in United States Arms Control Disarmament Agency, Texts and Histories of Negotiations (Washington, D.C.: GPO, 1996), 71.

[76] American policymakers must also work out other issues such as gaining Congressional support for funding this initiative (especially if we provide C2 free of charge or at greatly reduced prices), protecting nuclear weapon design secrets and other classified information, and ensuring the support provided is not transferred by India or Pakistan to a third party.

[77] Mike Allen, "Bush Calls for Missile Shield," Washington Post (May 2, 2001), 1. Also see David E. Sanger and Steven Lee Myers, "In Strategy Overhaul, Bush Seeks a Missile Shield," New York Times (May 2, 2001), A1+. As with the criticism of President Bush's recent call to deploy a ballistic missile shield and reach a separate "understanding" with Russia vice modifying the ABM Treaty, we can expect an even greater domestic and foreign hue and cry against changing the NPT. There are two issues here: whether to share and how to do it. As to the first issue, once the United States convinces India and Pakistan of its bona fides in reducing the dangers of nuclear exchange, the White House and others must take a proactive public relations stand with its allies, Congress and the public outlining the cost versus risks rationale behind sharing nuclear C2. (One argument can be that as much as limited missile defenses and sharing of early warning data with Russia reduces the chance of an inadvertent/accidental Russian missile launches against the United States, so too does the sharing of nuclear C2 technologies reduce the chance of intra-South Asian nuclear exchanges.) As to the second issue, unofficial, secret or even covert assistance to South Asian nuclear C2 will provide only so much plausible deniability. As much as possible, this process should openly take place under the larger auspices of the NPT as part of a similar "understanding" with other NPT signatories (or at least other nuclear weapon states). Only if it is absolutely necessary should moves be made to modify the treaty. Ignoring or even abrogating the treaty would be untimely, counter-productive and unnecessary.

[78] Mazari, 6.

[79] See Giles, 182-183; and, Feaver/Niow, 210.

[80] Feaver/Niow, 215.

[81] Nye , 1295.

[82] Feaver/Niow, 210.

[83] Leonard S. Spector, "Neo-Nonproliferation," Survival 37 (Spring 1995), 66.

[84] See Feaver/Niow, 210; Seng, 89-90; and, Giles, 183.

[85] Cirincione, 121-122, 134.

[86] In the words of Christina Rocca, Assistant Secretary of State Designate for South Asia, at her Senate confirmation hearings, "these sanctions have outlived their usefulness and that we need…a new way to accomplish our nuclear concerns and get rid of the sanctions. The sanctions have to go." ("U.S., Indian Officials Discuss Regional Security," Washington Times [May 18, 2001]) at http://ebird.dtic.mil/May2001/e20010518usindian.htm. See also Robert M. Hathaway, "Confrontation and Retreat: The U.S. Congress and the South Asian Nuclear Tests," Arms Control Today (January-February 2000), 7, 12.

[87] Giles, 183-184.

[88] Caldwell, 224.

[89] James G. Blight and David A. Welch, "Risking 'The Destruction of Nations': Lessons of the Cuban Missile Crisis for New and Aspiring Nuclear States, " Security Studies 4 (Summer 1995), 824, 847-848; and, Blair/Steinbrunner, 1.

[90] Nye, 1296.

[91] John Andrew Errickson, The Cuban Missile Crisis of 1962: Miscalculations, Escalation, and Near Nuclear Confrontation, Master's Thesis (Florida State University, 1994)

[92] Michael Krepon, "A Ray of Hope," The Washington Quarterly 24 (Spring 2001), 175.

[93] Sumit Ganguly, The Origins of War in South Asia: Indo-Pakistani Conflicts since 1947, Westview Special Studies on South and Southeast Asia (Boulder: Westview Press, 1986), 45.

[94] Shamshad Ahmad, "The Nuclear Subcontinent: Bringing Stability to South Asia, " Foreign Affairs 78 (July-August 1999), 125.

[95] Alexander Evans, "Why Peace Won't Come to Kashmir," Current History 100 (April 2001), 173.